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REVIEW OF REPORTS ON LAKE ERIE-LAKE ONTARIO WATERWAY, NEW YORK.--ETC(U)
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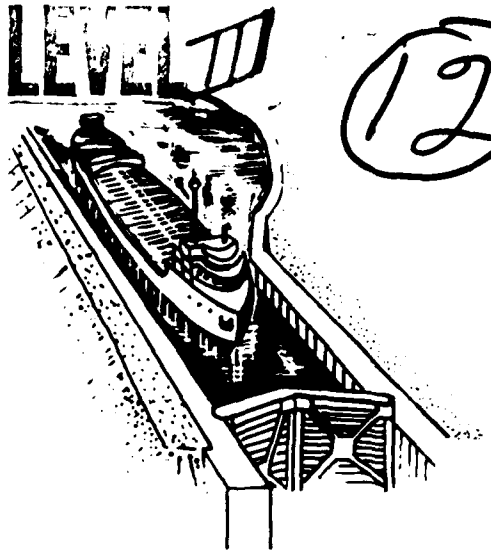

REVIEW of REPORTS

on

LAKE ERIE - LAKE ONTARIO WATERWAY N.Y.

SUMMARY REPORT

U.S. ARMY CORPS OF ENGINEERS
BUFFALO DISTRICT

OCTOBER 1973

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

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INTRODUCTION

The Great Lakes System, the major trade and commerce thoroughfare along the United States and Canadian boundary, is of vital importance to the economy of the United States and Canada. The Great Lakes, along with the St. Lawrence River, provides a continuous waterway extending about 2,300 miles into the heart of the North American Continent. The Welland Canal in Canada, the only connection for deep-draft vessels between Lake Erie and Lake Ontario, is an integral part of this system. Since its completion in 1932, traffic has steadily increased, and projections of traffic volume indicate that the Welland Canal will reach its practical capacity in about 1990. This would limit further traffic growth and create a bottleneck to Great Lakes - St. Lawrence Seaway shipping.

The U. S. Congress assigned the Chief of Engineers the task of studying a waterway alternative that would prevent this future navigational bottleneck in shipping. The Buffalo District, Corps of Engineers, then undertook an in-depth investigation of the feasibility of constructing a deep-draft waterway in United States territory, between Lake Erie and Lake Ontario, that would provide the additional capacity required to maintain a growing and efficient waterway system within the Great Lakes.

The plan developed for the Lake Erie - Lake Ontario Waterway utilizes the Niagara River and an overland section to connect Lake Erie to Lake Ontario. The alignment proposed is shown on Attachments 1 and 2 of this Summary Report. The Waterway would accommodate ships 1,000 feet long and 110 feet wide. The maximum size ship that can pass through the existing Welland Canal is 730 feet long and 75 feet wide.

The total report contains five appendices, a Main Report, and a Summary Report. The appendices include hydraulic, economic, environmental, design and cost, and foundations and materials investigations. The investigations concluded that the canal would be hydraulically, geologically, engineeringly, and ecologically feasible, but not economically justified, based solely on transportation savings to United States traffic.

The unilateral nature of this study on the Lake Erie - Lake Ontario Waterway prevented the inclusion in the benefit/cost ratio of benefits to Canadian traffic and the effect on the Great Lakes System if no structural improvements are made. Inclusion of Canadian traffic benefits would result in an increase of 25 to 30 percent in the average annual transportation savings. Other benefits, such as regional economic development and recreation, were also not included.

A

Review of Reports on Lake Erie - Lake Ontario Waterway, NY shows the need for some major waterway improvements between Lake Erie and Lake Ontario to allow continued growth of waterborne commerce on the Great Lakes System. These improvements would provide the additional capacity to meet that need for about 50 years. However, construction of the waterway is not economically justified, based solely on United States transportation benefits and when analyzed as an increment to, rather than an integral part of, the entire system.

The report therefore recommends international cooperation to develop analyses, system-wide in scope, on the Great Lakes - St. Lawrence Seaway System.

AUTHORITY

The Review of Reports on Lake Erie - Lake Ontario Waterway, NY is submitted in compliance with resolutions of committees of the United States Congress; the first resolution was adopted on 6 May 1958. The resolutions are contained in paragraph two of the Main Report.

PURPOSE

The purpose of this report is to present the results, conclusions, and recommendations from the review and study of the environmental, engineering, and economic aspects of the construction of a waterway between Lake Erie and Lake Ontario in the United States and to serve as a basis for further action by Congress.

DESCRIPTION OF PROJECT AREA

The canal route is located in Erie and Niagara Counties in the western part of New York State. The east end of Lake Erie and the west end of Lake Ontario are generally parallel, 20 to 30 miles apart. The canal would connect the Niagara River, and thus Lake Erie, to Lake Ontario and would traverse a 325-foot drop including the 240-foot Niagara Escarpment. Refer to map labeled Attachment 2 for further locational details and Attachment 3 for details on the 5-lock plan and the distance of each lock from Lake Erie.

INVESTIGATIONS AND THEIR CONCLUSIONS

PUBLIC CONTACTS. Numerous public contacts have been made during the course of the study. Corps of Engineers personnel made numerous appearances before various groups interested in the study. Many feature articles have appeared in area newspapers. In the early stages of the report, the State of New York held two public hearings to obtain the

views of interested parties regarding the impact of the proposed improvements on State planning objectives. During the latter stages of the study, Corps personnel held five public information meetings in localities along the route. The purpose was to inform the residents of the general plan being considered and to solicit their opinions. The final public meetings, held in Niagara County, New York, and Chicago, Illinois, are discussed near the end of this Summary, before "Conclusions".

HYDRAULICS AND HYDROLOGY. Investigations were concerned primarily with the effect of the waterway on the flow of the Niagara River, the large difference in elevation between Lake Erie and Lake Ontario, and the filling and emptying systems for the locks. Model studies were made to investigate the effect on river flow of plans for a new lock to pass ships around the rapids at the head of the river. The tests also were used to develop preliminary plans for remedial measures. Another model was used to study plans for the entrance to the overland section from the river. One of the major concerns of the hydraulic studies was the determination of methods for rapid filling and emptying the high-lift locks in the overland section without causing undesirable surges in the canal. Out of several alternatives investigated, it was concluded that the most desirable method of surge control would be a series of surge basins connected directly to the locks proper. Hydraulic studies concluded that the canal is hydraulically feasible with the inclusion of the surge basins. An artist's sketch of the lock's filling system is Attachment 4, and a diagram of a section of canal with a surge basin is Attachment 5.

SURVEYS AND MAPPING. An extensive field survey program was required to obtain data for design and estimating purposes. Much topographic data along the overland section were available from the State Department of Transportation, and Lake Ontario soundings were obtained from the U. S. Lake Survey Center. Soundings and probings for ledge rock were taken in the Niagara River between Squaw Island and the junction with the overland section. Soundings and probings were available in the project areas of Black Rock Canal and Buffalo Harbor. The Buffalo Harbor-North Entrance Channel was swept to locate obstructions shallower than 30 feet. Data were obtained from highway agencies on traffic on the highways affected by the project. Information was assembled on all structures and utilities on and crossing the considered route.

MATERIALS AND FOUNDATION INVESTIGATIONS. An extensive subsurface investigation program was conducted as part of the study, primarily in the overland section. Numerous core borings were taken along the considered line of the canal. The purpose was to locate the top of rock and obtain samples of both overburden and rock. Numerous samples were examined and tested in laboratories. The information was used as a basis for design of locks and dikes and for estimating quantities of overburden and rock to be excavated. Based on the studies and analyses performed, it was concluded that construction of the proposed waterway is feasible insofar as local soils and geologic conditions are concerned.

DESIGNS AND ESTIMATES. Designs and estimates, in general, were made in detail appropriate for a report of survey scope. However, the lock structural design was carried out in considerable detail. The combination of lift, width, length, and depth over sill called for locks of unprecedented size. Originally, a three-lock, 107-foot lift alternative was considered; however, after evaluation of foundation conditions, a four-lock, 80-foot lift was determined the better alternative. Structural design was done in sufficient detail to establish that the locks could be built using acceptable design criteria. Design of a typical section of the retention dikes established that unusual problems would not be encountered. For other structures, designs were made for survey scope estimating purposes. Cost estimates are based upon unit prices for comparable work applied to quantity estimates. It was concluded that the canal is engineeringly feasible.

ECONOMIC STUDIES. Considerable pertinent data used in the economic study were obtained from other recent studies. In addition, an origin-destination study was made of all waterborne movements utilizing the Welland Canal in 1970. A transportation rate study was made for waterborne and overland alternative routings for commodities moving or projected to move through the Great Lakes - St. Lawrence River System. A computer simulation analysis of the existing Welland Canal was made in order to determine when the traffic passing through the Welland Canal would be constrained by the physical capacity of the system. The traffic and simulation studies indicated that without major structural improvements the Welland Canal will reach practical capacity by 1990 under conditions represented by projected traffic and optimum traffic management.

ENVIRONMENTAL STUDIES. These studies depended for the most part on available data supplemented by field inspections and interviews with local officials and knowledgeable residents. The most significant impacts appear to be the acquisition of homes, disruption of the community, and excavation and spoil requirements. Western New York is in a Zone 3 earthquake area where major earthquake damages may occur. Therefore, designs and construction must consider this factor. Because of the distance from the nearest fault and the relatively shallow depth of excavation, the waterway would have virtually no effect on the occurrence of seismic disturbances. The environmental consultant for this study found no adverse environmental impacts that would be of such a magnitude that the Canal would be ecologically unacceptable.

GREAT LAKES - ST. LAWRENCE WATERWAY SYSTEM

The Great Lakes - St. Lawrence System provides a continuous waterway extending 2,300 miles into the heart of the North American Continent. (See Attachment 1 for map of the system) The largest lock at Sault Ste. Marie is 110 feet by 1200 feet. Lake St. Clair and connecting channels can currently accommodate ships in excess of even those at Sault Ste. Marie.

The Welland Canal is the existing link from Lake Ontario to the rest of the Great Lakes System. It was built by Canada in 1932 and contains one guard and seven lift locks, each 800 feet by 80 feet, with a 27-foot depth, the minimum depth in any part of the system. The St. Lawrence Seaway Locks are of the same dimensions as the Welland Canal. Each of the four constraint areas may at some time be the critical site. The most obvious need in the near future is at the Welland. The Welland Canal handled 63 million tons in 1971. The Lake Erie - Lake Ontario Canal would not replace the Welland, but would serve as a parallel canal to provide additional capacity.

PLAN OF IMPROVEMENT

The considered waterway would connect Lakes Erie and Ontario via a navigable channel (See Attachment 2). A harbor would be constructed on Lake Ontario at the canal entrance. The waterway would become an integral part of the Great Lakes - St. Lawrence Seaway System, which would allow shipping between the Great Lakes and would provide for the transit of ocean-going ships from the North Atlantic to ports throughout the entire system. The canal would have a minimum bottom width of 600 feet to meet standards for two-way traffic; the channel would have a minimum depth of 30 feet. The locks were designed to be 110 feet wide by 1,200 feet between gates and will permit passage of a maximum size vessel of approximately 105 feet by 1,000 feet. This is the same size as the largest lock now in the system at Sault Ste. Marie. Four locks each with a lift of 80 feet are proposed for the overland section; the lock in the Niagara section would have a normal lift of 5 feet. For lockage, surge basins would be required to minimize surges in the channel in the overland section caused by rapid displacement of large volumes of water during filling and emptying the locks. In the overland section, the waterway would necessitate the relocation of approximately 300 residences, 12 roads, 4 railroads, and 20 utilities and the acquisition of approximately 10,000 acres of land. The Niagara River section would require the replacement or raising of major bridges and railroads, the relocation of the Squaw Island Waste Treatment Plant along the Buffalo River to the end of Katherine Street, and the lowering of submarine utility lines.

TRANSPORTATION ECONOMICS AND SYSTEMS ANALYSIS

Economic studies and projection of trends in waterborne traffic combined with computer simulation of the existing Welland Canal indicate that unless some structural improvements to the Welland Canal are made before 1990, traffic desiring to traverse the entire Great Lakes System will be constrained by the practical limits on capacity of the canal. Not only will there be too many vessels to handle, but if the trend in fleet composition continues, traffic will be further constrained as

many vessels will be too large to pass through the existing Welland Canal. If this occurs, the Great Lakes Region of the United States and Canada will lose a significant amount of future waterborne commerce, requiring the use of more costly means of distributing bulk and general cargo commodities. The potential loss for the United States would affect the United States Great Lakes tributary area, representing thirty-six percent of the nation's population and affecting all or portions of 19 states.

The growing energy crisis could significantly affect the conclusions of future waterborne studies. Current traffic projections and transportation cost analyses are based on past conditions of ample low-cost energy sources. Since waterborne commerce is a low-energy transport mode, an increase in energy costs could favor diversion of traffic to water transport and also increase water movement of more abundant energy sources such as coal. Since waterborne commerce is generally the most economical mode of transportation for moving goods over long distances, increased transport costs of other modes would be passed on to consumers in the Great Lakes area. In addition, products that are now exported via the Great Lakes from the mid-continent area would not be as competitive in foreign market areas due to higher transportation costs. Well-established Great Lakes ports would lose some of the efficiency realized by economies of scale. Their magnitude of trade will not necessarily decline, but they will not expand and continue the healthy growth that would occur if traffic were not constrained.

The Welland Canal is an integral part of the Great Lakes - St. Lawrence Seaway Navigation System. The limitations on future growth of waterborne commerce as controlled by the practical capacity of the Welland Canal also inhibits growth in other system areas such as the St. Lawrence Seaway and Great Lakes harbors. An unimproved Welland Canal could result in an underutilization of these and other system components.

The Lake Erie - Lake Ontario Waterway, representing a supplemental facility to the existing Welland Canal, would provide additional capacity sufficient to meet the projected waterborne traffic demand between Lake Erie and Lake Ontario through the 2030-2040 decade.

OTHER ECONOMIC EFFECTS

In addition to the transportation savings realized, the Lake Erie - Lake Ontario Canal would also provide immediate savings to shippers through reduced traffic delays (current operating costs are about $300/per hour). The Great Lakes System would benefit by increased efficiency in maintenance scheduling and insurance against accidents or failures that would require the temporary shutdown of one canal. If the trend in navigation season extension continues, the parallel canals become even more important in efficient maintenance scheduling.

In emergency situations, the positions of both countries would be enhanced by having a larger capacity and two canals in operation to transport large quantities of goods. The canal would stimulate the development of the region around it as a result of benefits to the local economy through the construction and operation and maintenance of the Lake Erie - Lake Ontario Waterway. The recreational visitation expected after project completion would continue to add income to the regional economic sector. Increased tourism, although an economic benefit, may be undesirable to some residents, since it would disrupt the quiet, rural atmosphere, characteristic of this area.

Not all of the economic effects are of a positive nature. Water required for lockages on the canal would have a potential adverse effect on the power industry located along the Niagara River. A reduction in the availability of water as a result of water required for commerce and recreational lockages could result in an additional cost to the power industry during peak power demand periods. Reduction in the tax base for Niagara County is another adverse regional economic effect but will be a temporary effect, partially offset after construction is completed by the relocations taking place in the area.

RECREATIONAL POTENTIAL

The canal, besides accommodating waterborne commerce, provides numerous potential recreational opportunities. The Niagara River, the canal, and the navigation locks would attract large numbers of additional boaters to the area to make use of the waterway. Other potential recreational possibilities include a scenic parkway along the east shore of the canal, a hiking-biking corridor along the west shore, a visitor center and observation area, numerous picnic areas, development of canal breakwaters into Lake Ontario to accommodate fishermen, landscaping of dikes to provide sledding, and development of the surge basins located adjacent to the navigation locks for fishing, swimming, boating, and ice skating purposes.

ENVIRONMENTAL QUALITY

The study of the effect of the canal on the surrounding area reveals that there are a number of potential adverse and beneficial impacts on the environment. The most pronounced environmental impacts are displayed in the matrix shown in Table 1. Some of the adverse impacts can be minimized. Others, although unable to be mitigated, have small impacts that our environmental consultant has evaluated as acceptable considering the magnitude of the considered canal.

TABLE 1

ASSESSMENT OF ENVIRONMENTAL IMPACTS

Evaluative Factors	Adverse	Some Adverse	Unknown	No Effect	Some Beneficial	Beneficial
1. Physical and Chemical Environment						
A. Land						
(1) Physiography (Roads, Bridges, and Railroads)		X				
(2) Soils (No additional borrow areas required)				X		
(3) Geology (Blasting, Crushing, and Hauling)	X					
B. Water						
(1) Stream Flow Variations		X	X			
(2) Groundwater Hydrology		X	X			
(3) Temperature		X		X		
(4) pH				X		
(5) Turbidity and Total Dissolved Solids		X				
(6) Dissolved Oxygen		X		X	X	
(7) Fecal Coliforms				X		
(8) Toxic Substances		X				
(9) Inorganic Nutrients		X		X		
C. Air						
(1) Pollution During Construction	X					
(2) Pollution After Construction		X				
D. Noise						
(1) During Construction	X					
(2) After Construction		X		X		
2. Ecological Environment						
A. Terrestrial Ecosystems						
(1) Natural Vegetation		X				
(2) Crops		X				
(3) Dominant Herbivores		X				
(4) Migratory Species		X			X	
(5) Small Game Animals		X				
(6) Rare and Endangered Species				X		
B. Aquatic Ecosystems						
(1) Vegetation				X		
(2) Zooplankton				X		
(3) Benthos		X				
(4) Fishes			X			
(5) Pest Species				X		
(6) Rare & Endangered Species				X		
3. Social Environment						
A. Socio-economics						
(1) Employment Base					X	
(2) Population Growth			X			
(3) Income Levels & Distribution					X	
(4) Unemployment Rate			X			
(5) Public Services			X			
(6) Public Service Revenues		X				
(7) Property Taxes		X				
B. Social						
(1) Community Characteristics and Patterns			X			
(2) Relocation of People And Businesses		X	X	X		
(3) Historical Atmosphere of Bergholtz		X	X		X	
(4) Barrier due to Transportation Blockage		X				
4. Recreational and Cultural Environment						
A. Educational/Scientific Packages						
(1) Unique Natural Features			X		X	
(2) Unique Cultural Features			X		X	
B. Recreation						
(1) Recreational Supply		X			X	
(2) Recreational Demand		X			X	
(3) Secondary Effects of Recreational Activities						X
(4) Aesthetics		X			X	

ESTIMATE OF PROJECT FIRST COST

The following costs are based on December 1972 price levels.

ITEM	AMOUNT
Land and Damages	25,000,000
Relocations	582,000,000
Locks	690,000,000
Channels and Canals	529,000,000
Recreation Facilities	10,000,000
Lake Ontario Harbor	163,000,000
Operation and Maintenance Facilities	16,800,000
Total Construction Cost	$2,015,800,000
Engineering and Design	60,500,000
Supervision and Administration	161,300,000
Total Project First Cost	$2,237,600,000

ESTIMATED ANNUAL CHARGES

It is estimated that the project could be constructed in five years. Interest during construction would amount to $357,930,000 (5-5/8 percent for one-half the construction period) making the total investment $2,595,530,000. Annual charges are estimated as follows:

Interest 5-5/8 percent	$145,999,000
Amortization 50 years at 5-5/8 percent	10,117,000
Operation & Maintenance	20,000,000
Total annual cost	$176,116,000

COMPARISON OF BENEFITS AND COSTS

The primary benefit category evaluated in the economic justification of navigation improvements is the savings to waterway users from the use of waterborne transportation, rather than the next least costly alternative or combination of modes. This savings was determined from a detailed transportation rate study for all commodities moving between Lake Erie and Lake Ontario, taking into account their initial origin and ultimate destination. The annual waterborne traffic benefits discounted at 5-5/8 percent were estimated to be $76,500,000. This does not include the secondary benefits discussed previously nor consideration for tolls on the waterway. The resultant benefit to cost ratio using only transportation related savings would be 0.4 to 1.

LOCAL COOPERATION AND ALLOCATION OF COSTS

Local cooperation, in terms of sharing in the financing, is not required for the new waterway. As an improvement of navigation, all costs of construction are a Federal responsibility. Local civic, commercial, and political entities have an interest in the outcome of the study because of the effect of the waterway on the region. In fact, such groups were the original proponents of the waterway and a moving force behind securing study authorization.

The New York State Joint Legislative Committee on Commerce and Economic Development held public meetings in 1960 and 1965, with generally favorable comment. In addition, the Corps of Engineers has held a series of public information meetings, workshops, and a final public meeting in localities along the proposed waterway route. In general, business interests projected a favorable view in terms of increased commerce, both local and throughout the system. Local civic officials and citizens expressed concern over the new waterway affects on the adjacent political and social environment, although many objections were to the siting of the route and not to the concept or need for a waterway.

COORDINATION WITH OTHER AGENCIES

During the course of the study, contacts were made with the following Federal agencies: Department of Transportation, Coast Guard, Environmental Protection Agency, Fish and Wildlife Service, Bureau of Outdoor Recreation, Federal Highway Administration, Geological Survey, Federal Aviation Administration, National Park Service, Soil Conservation Service, and Forest Service. State agency contacts were also made with the following: Department of Transportation, Department of Environmental Conservation, and Office of Parks and Recreation. Local agency contacts included: Erie and Niagara Counties Regional Planning Board, other County agencies, and local governments.

The purpose of the coordination was to advise the agencies of the study and plan being considered, to obtain data for use in the study, to obtain information on plans and programs of the agencies, and to determine and attempt to resolve any major conflicts.

PREFERENCE SETS FOR CHOICE AMONG ALTERNATIVES

Many impacts and effects have been previously discussed. The purpose of Tables 2, 3, and 4 is to organize these impacts and effects in terms of "preference sets" that should facilitate choice, or the expression of a preference for one particular alternative by the people affected.

TABLE 2

PREFERENCE SETS FOR CHOICE AMONG ALTERNATIVE PLANS FOR THE RESIDENTS OF THE NIAGARA FRONTIER ABOVE THE ESCARPMENT

PREFERENCE SET I	PREFERENCE SET II	PREFERENCE SET III
In order to choose the U. S. canal alternative, residents of the Niagara Frontier, above the escarpment, must prefer to:	In order to choose the Canadian improvement alternative, residents of the Niagara Frontier, above the escarpment, must prefer to:	In order to choose the "Do nothing" alternative, residents of the Niagara Frontier, above the escarpment, must prefer to:
1. Have regional economic development	1. Have greater efficiency in waterway system	1. Avoid sharing cost of construction and operation through national taxes
2. Have additional water surface area	2. Have insurance against waterway closure due to accident	2. Avoid minor adverse ecological impacts
3. Have additional recreational opportunities	3. Have lower transportation costs	3. Avoid loss of approximately 180 homes and 4000 acres of land
4. Have greater U. S. economic investment in Great Lakes waterway system	4. Have future waterborne traffic growth	4. Avoid noise from construction
5. Have greater efficiency in waterway system	5. Have national economic growth	5. Avoid increased recreational and tourist activity
6. Have insurance against waterway closure due to accident	6. Avoid sharing cost of construction and operation through national taxes	6. Avoid some loss of taxable property
7. Have lower transportation costs	7. Avoid minor adverse ecological impacts	7. Avoid loss of water for generation of hydro-electric power
8. Have future waterborne traffic growth	8. Avoid loss of approximately 180 homes and 4000 acres of land	8. Avoid loss of community cohesion
9. Have national economic growth	9. Avoid noise during construction	
	10. Avoid increased recreational and tourist activity	
	11. Avoid some loss of taxable property	
	12. Avoid loss of community cohesion	
And be willing to:	And be willing to:	And be willing to:
1. Share cost of construction and operation of waterway through national taxes	1. Forego regional economic development	1. Forego regional economic development
2. Accept minor adverse ecological impacts	2. Forego additional water surface area	2. Forego additional water surface area
3. Accept loss of approximately 180 homes and 4000 acres of land	3. Forego additional recreational opportunities	3. Forego additional recreational opportunities
4. Accept noise during construction	4. Forego greater U. S. economic investment in Great Lakes waterway system	4. Forego greater U. S. economic investment in Great Lakes waterway system
5. Accept increased recreational and tourist activity	5. Accept loss of water for generation of hydro-electric power	5. Forego greater efficiency in waterway system
6. Accept some loss of taxable property		6. Forego insurance against waterway closure due to accident
7. Accept loss of water for generation of hydro-electric power		7. Forego lower transportation costs
8. Accept loss of community cohesion		8. Forego future waterborne traffic growth
		9. Forego national economic growth

TABLE 3

PREFERENCE SETS FOR CHOICE AMONG ALTERNATIVE PLANS FOR THE RESIDENTS OF THE NIAGARA FRONTIER BELOW THE ESCARPMENT

PREFERENCE SET I	PREFERENCE SET II	PREFERENCE SET III
In order to choose the U. S. Canal alternative, residents of the Niagara Frontier, below the escarpment, must prefer to:	In order to choose the Canadian improvement alternative, residents of the Niagara Frontier, below the escarpment, must prefer to:	In order to choose the "Do nothing" alternative, residents of the Niagara Frontier, below the escarpment, must prefer to:
1. Have regional economic development	1. Have greater efficiency in waterway system	1. Avoid sharing cost of construction of operation of waterway through national taxes
2. Have additional water surface area	2. Have insurance against waterway closure due to accident	2. Avoid minor adverse ecological impacts
3. Have additional recreational opportunities	3. Have lower transportation rates	3. Avoid relocation of approximately 120 homes
4. Have greater U. S. economic investment in Great Lakes waterway system	4. Have future waterborne traffic growth	4. Avoid noise from construction
5. Have greater efficiency in waterway system	5. Have national economic growth	5. Avoid increased recreational and tourist activity
6. Have insurance against waterway closure due to accident	6. Avoid sharing cost of construction and operation through national taxes	6. Avoid some loss of taxable property
7. Have lower transportation costs	7. Avoid minor adverse ecological impacts	7. Avoid loss of water for generation of hydro-electric power
8. Have future waterborne traffic growth	8. Avoid relocation of approximately 120 homes	8. Avoid loss of cropland
9. Have national economic growth	9. Avoid noise during construction	9. Avoid significant loss of community cohesion
	10. Avoid increased recreational and tourist activity	10. Avoid loss of a total of approximately 6000 acres of land
	11. Avoid some loss of taxable property	
	12. Avoid significant loss of cropland	
	13. Avoid loss of community cohesion	
	14. Avoid loss of a total of approximately 6000 acres of land	
And be willing to:	And be willing to:	And be willing to:
1. Share cost of construction and operation of waterway through national taxes	1. Forego regional economic development	1. Forego regional economic development
2. Accept minor adverse ecological impacts	2. Forego additional water surface area	2. Forego additional water surface area
3. Accept relocation of approximately 120 homes	3. Forego additional recreational opportunities	3. Forego additional recreational opportunities
4. Accept noise during construction	4. Forego greater U. S. economic investment in Great Lakes waterway system	4. Forego greater U. S. economic investment in Great Lakes waterway system
5. Accept increased recreational and tourist activity	5. Accept loss of water for generation of hydro-electric power	5. Forego greater efficiency in waterway system
6. Accept some loss of taxable property		6. Forego insurance against waterway closure due to accident
7. Accept significant loss of cropland		7. Forego lower transportation costs
8. Accept loss of water for generation of hydro-electric power		8. Forego future waterborne traffic growth
9. Accept loss of community cohesion		9. Forego national economic growth
10. Accept loss of a total of approximately 6000 acres of land		

TABLE 4

PREFERENCE SETS FOR CHOICE AMONG ALTERNATIVE PLANS FOR THE RESIDENTS OF THE UNITED STATES GREAT LAKES TRIBUTARY AREA

PREFERENCE SET I	PREFERENCE SET II	PREFERENCE SET III
In order to choose the U. S. Canal alternative, residents of the United States Great Lakes tributary area, must prefer to:	In order to choose the Canadian improvement alternative residents of the United States Great Lakes tributary area must prefer to:	In order to choose the "Do "nothing" alternative, residents of the United States Great Lakes tributary area must prefer to:
1. Have greater U. S. economic investment in Great Lakes waterway system	1. Have greater efficiency in waterway system	1. Avoid sharing cost of construction and operation of waterway through national taxes
2. Have greater efficiency in waterway system	2. Have insurance against waterway closure due to accident	
3. Have insurance against waterway closure due to accident	3. Have lower transportation costs	
4. Have lower transportation costs	4. Have future waterborne traffic growth	
5. Have future waterborne traffic growth	5. Have national economic growth	
6. Have national economic growth	6. Avoid sharing cost of construction and operation of waterway through national taxes	
And be willing to:	And be willing to:	And be willing to:
1. Share cost of construction and operation of waterway through national taxes	1. Forego greater U. S. economic investment in Great Lakes waterway system	1. Forego greater U. S. economic investment in Great Lakes waterway system
		2. Forego greater efficiency in waterway system
		3. Forego insurance against waterway closure due to accident
		4. Forego lower transportation costs
		5. Forego future waterborne traffic growth
		6. Forego national economic growth

FINAL PUBLIC MEETINGS

Two final public meetings were held in September 1973. The purpose was to present a review of the study and its draft conclusions and recommendations so public comments could be incorporated and final conclusions and recommendations could be developed.

Invitations and copies of the draft of the Summary Report were mailed to more than 500 local citizens and almost 3,000 persons representing governmental, commercial, and other interests throughout the Great Lakes system. In addition, environmental and conservation organizations were sent this information, and news releases were sent to all media. Full sets of the draft report were sent to local libraries and Corps of Engineers offices along the Great Lakes. The Draft Summary Report invited review of the report at those locations.

The first meeting was held during the evening of 25 September in the Town of Wheatfield, Niagara County, New York. This meeting allowed citizens to again voice their major concerns with a waterway passing through their localities. Approximately 150 persons attended the meeting. The District Engineer, Buffalo District, presided. Local mayors and other political representatives directly along the route were generally opposed to a waterway that would disrupt the life style of their citizens. The particular route studied was especially offensive to many. Others living away from the route favored the regional development offered by the project. Many local citizens questioned the legal and financial implications of a canal. Some expressed support for the concept of a waterway improvement for economic and national goals, while others wanted no further investigations or money allocated to such a waterway.

The second public meeting was held during the afternoon of 27 September in Chicago, Illinois. This meeting allowed shippers, agencies, and others interested in the waterway, and system as a whole, to respond to the draft report. Approximately 50 persons attended the meeting, which was presided over by the Deputy District Engineer, Buffalo District. A representative of the industrial users of the Great Lakes strongly pressed for immediate further study. He wanted additional economic considerations made and pointed to significant loss of business if some improvements are not made by 1990. The Seaway Development Corporation also believed that the economic analysis was incomplete and that the U. S. Department of Transportation should be directly involved in future navigation efforts of this sort. The State of Ohio Department of Natural Resources sent a telegram concurring with the recommendations of the Buffalo District regarding an international approach to the Waterway system.

The transcripts and statements of both meetings are contained in the supplement to the Main Report.

CONCLUSIONS

1. Some major waterway improvement, in the form of a new waterway or structural improvements to the Welland Canal locks and channels, must be constructed between 1980 and 1990 to prevent the restriction of navigation between Lake Erie and Lake Ontario. This restriction would have an adverse effect on the economic benefits that would otherwise develop with the natural growth of waterborne transportation in the Great Lakes Area.

2. A decision on what form of improvement should be undertaken must be made by 1980 in order to allow adequate construction time between 1980 and 1990.

3. The benefit/cost ratio for the proposed plan is 0.4 to 1, compared to 1.48 to 1 for the plan developed in the 1961 Feasibility Report. The proposed plan is more comprehensive than the previous plan, which accounts for some of this change. Escalation of prices, however, and the increase in interest rate from 2-5/8 percent to 5-5/8 percent, are responsible for the major portion of this drastic reversal. As the interest rate increases, benefits decrease and costs increase.

4. A new canal would provide adequate capacity for 50 years and substantial benefits in transportation savings plus numerous other secondary benefits.

5. If the Lake Erie - Lake Ontario Waterway were provided, regional development would be stimulated and recreational opportunities in the area would increase. Our studies have concluded that the Lake Erie - Lake Ontario Canal is technically and ecologically feasible, but not economically justified based solely on transportation savings and when analyzed as an increment to, rather than an integral part of, a system.

RECOMMENDATIONS

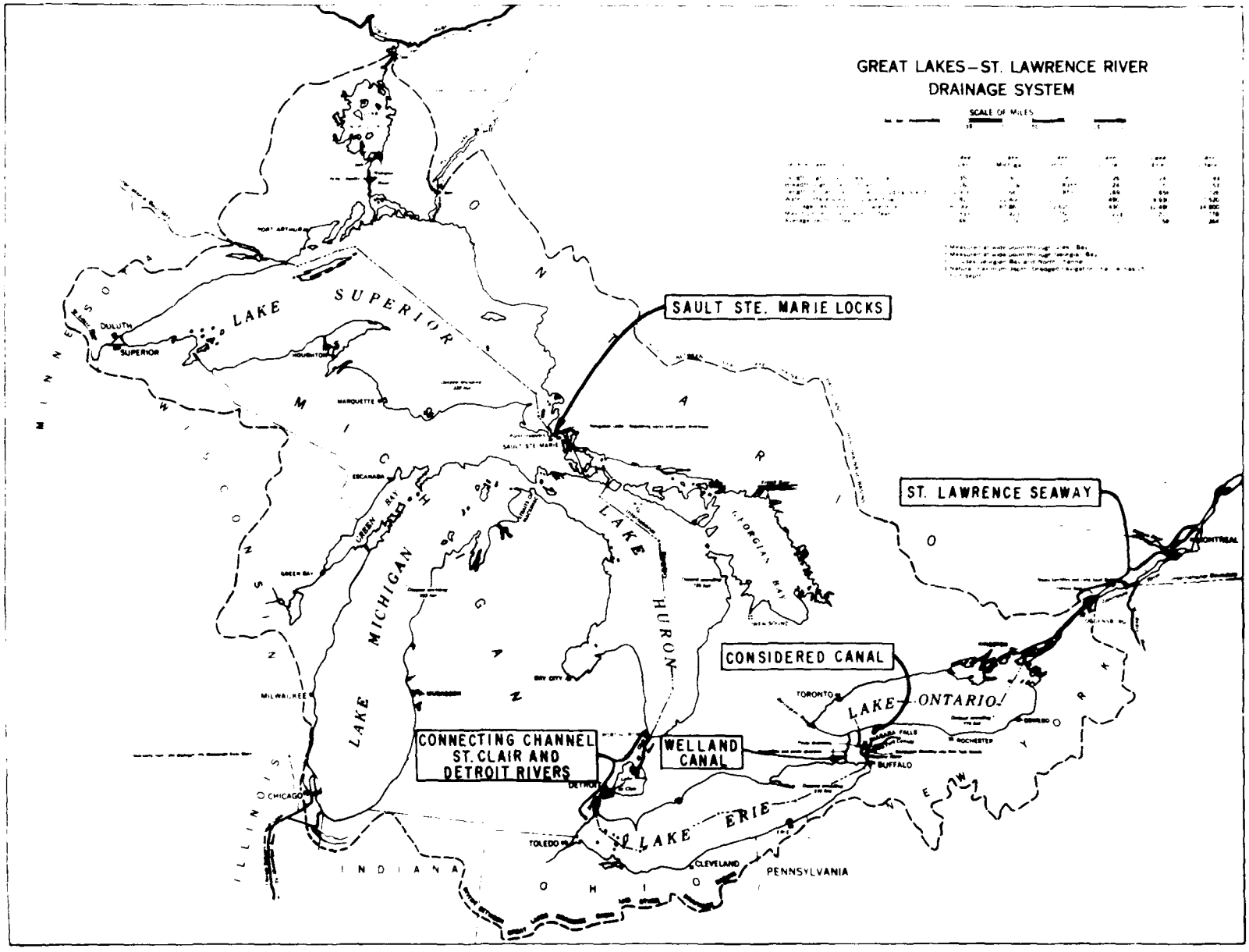
1. There should be international cooperation to consider existing conditions and future needs of the total Great Lakes - St. Lawrence Seaway Navigation System. Studies to date indicate a need for major structural improvements by 1990, between Lake Erie and Lake Ontario, in order to prevent future constraints to the Navigation System.

2. The cooperative effort should be undertaken immediately in order to reach decisions by 1980 that would allow physical facilities to be developed before navigation capacity is met.

3. Such an effort should consider the total demand for transportation in the United States and Canadian Great Lakes - St. Lawrence Region, with a goal to meet these countries' needs in 1990 and subsequent decades.

4. Advantage should be taken of ongoing navigation studies such as the Great Lakes Navigation Season Extension Study and the St. Lawrence Seaway Study for relevant data and conclusions.

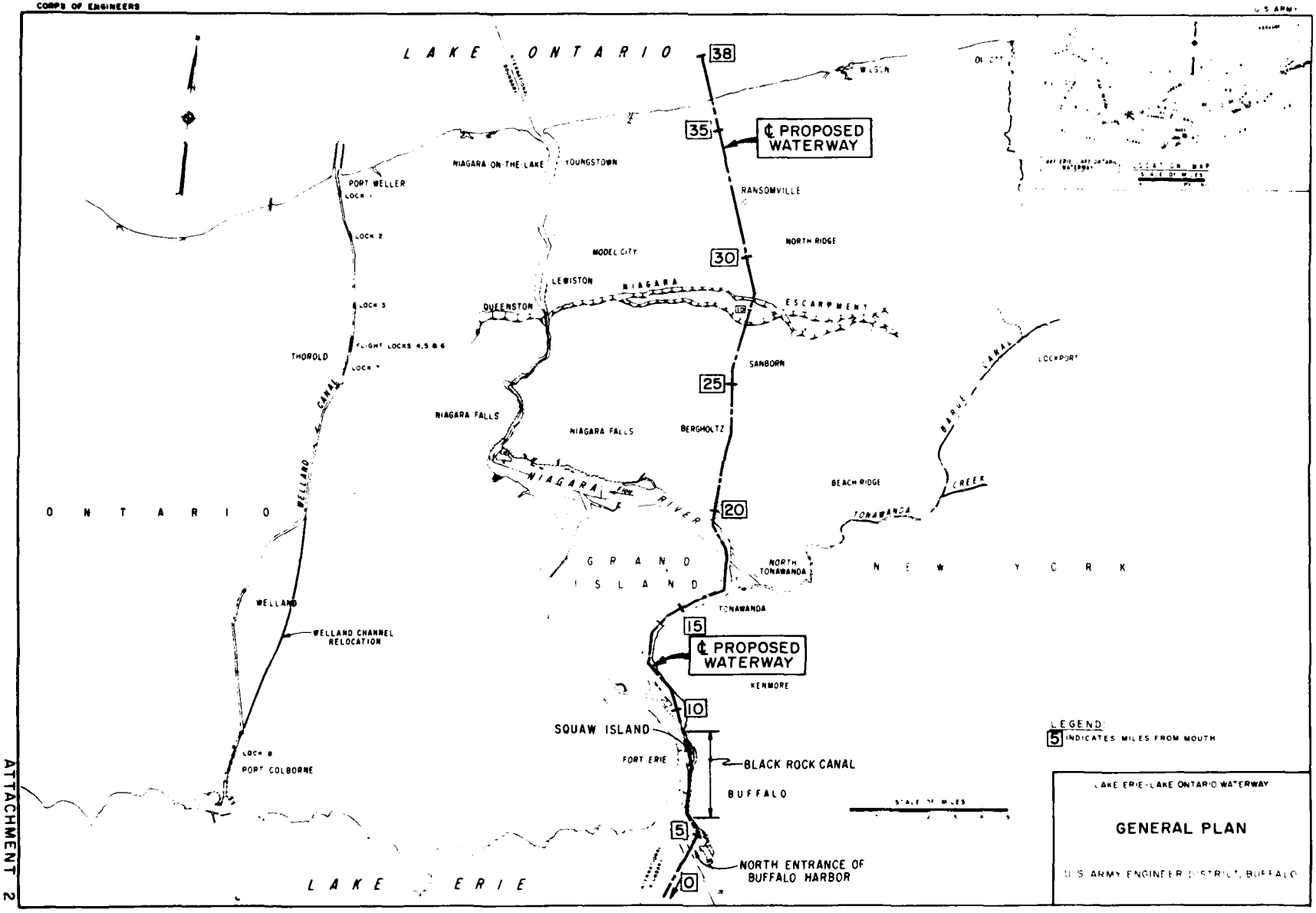
5. The major goal of the cooperative effort should be to develop a system-wide program for the Great Lakes - St. Lawrence Seaway Navigation System to insure proper timing, sizing, and sequencing of future navigation improvements to agree with the projected need.



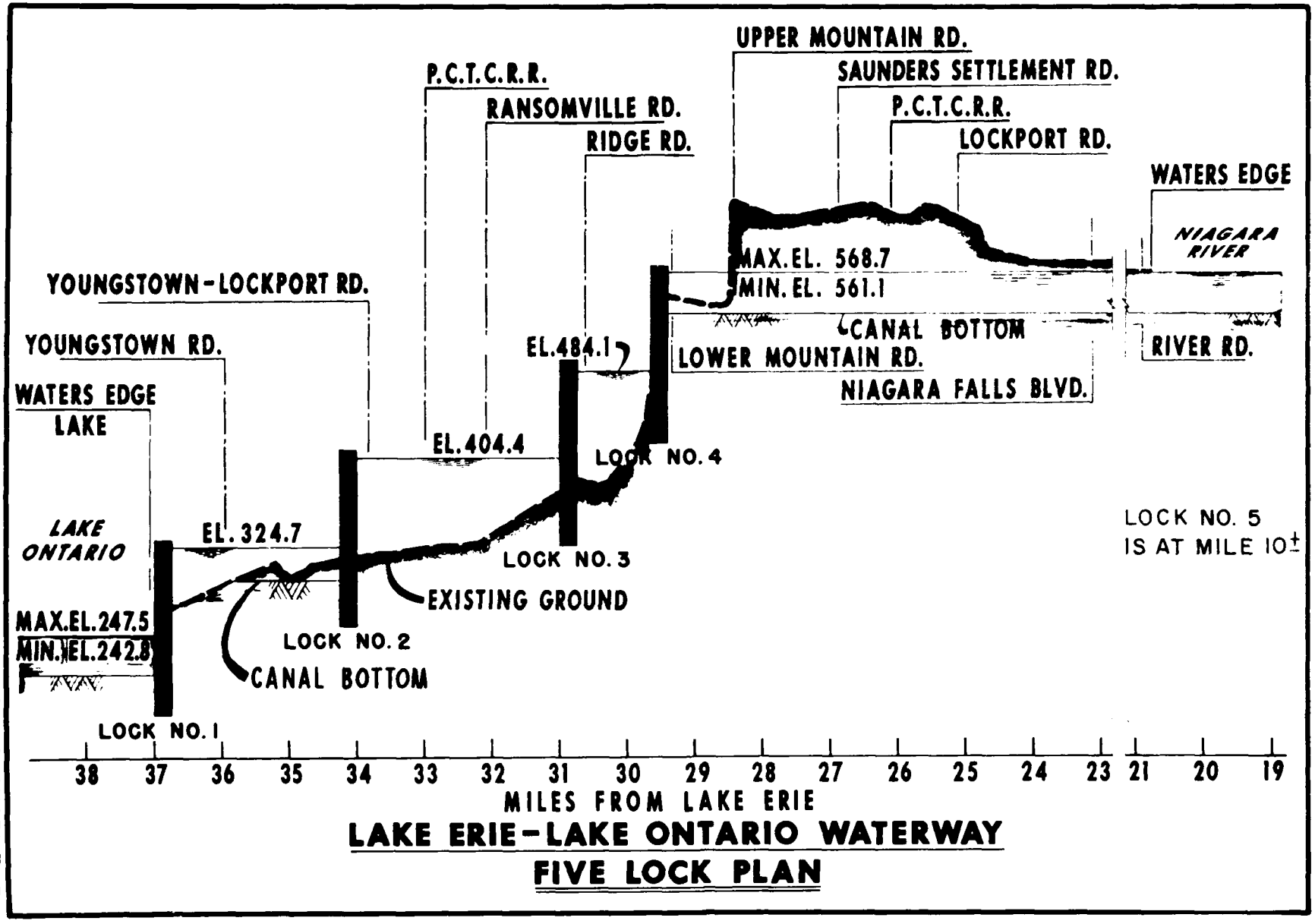
ATTACHMENT 1

CORPS OF ENGINEERS

U.S. ARMY



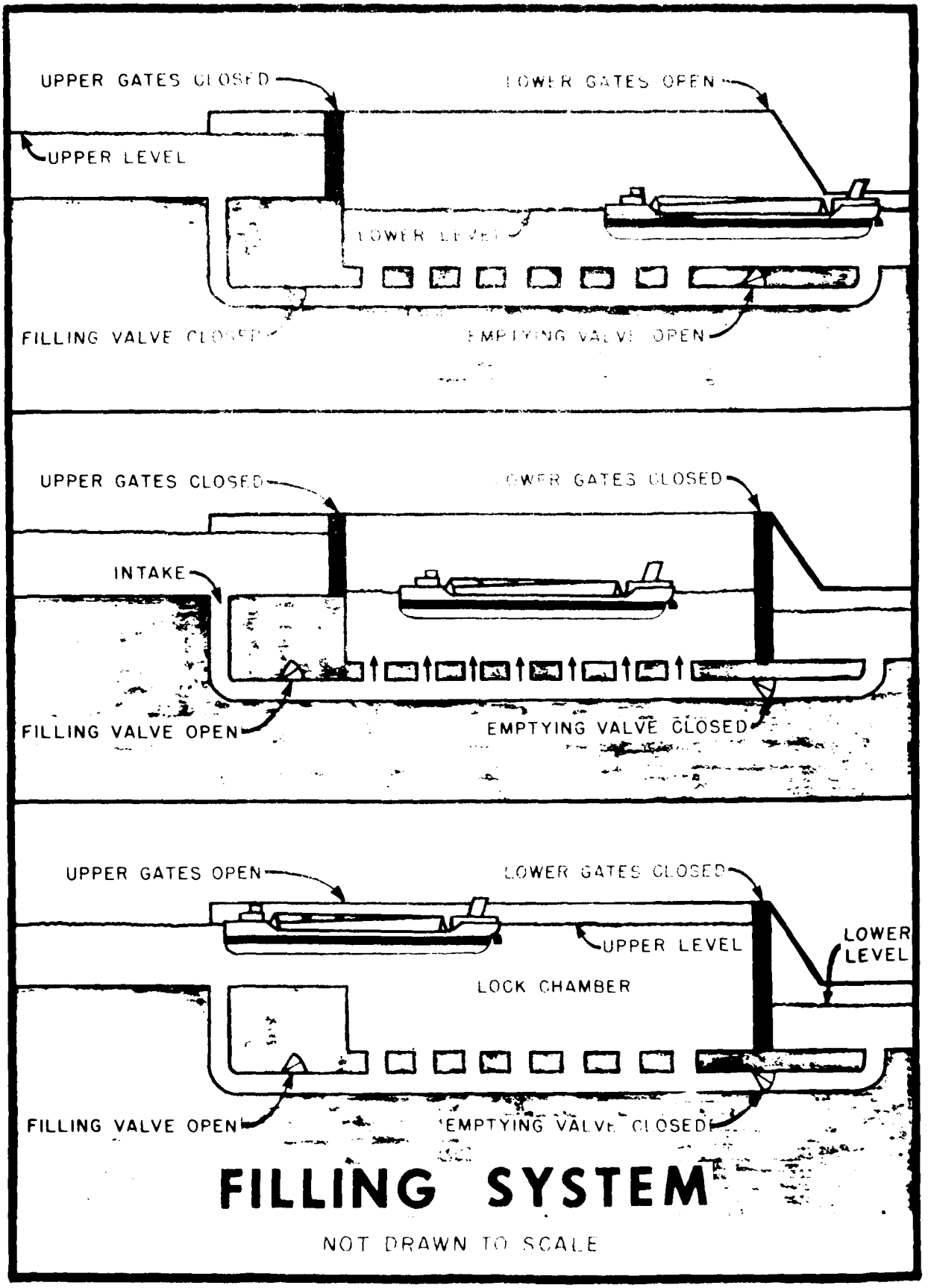
ATTACHMENT 2



LAKE ERIE-LAKE ONTARIO WATERWAY

FIVE LOCK PLAN

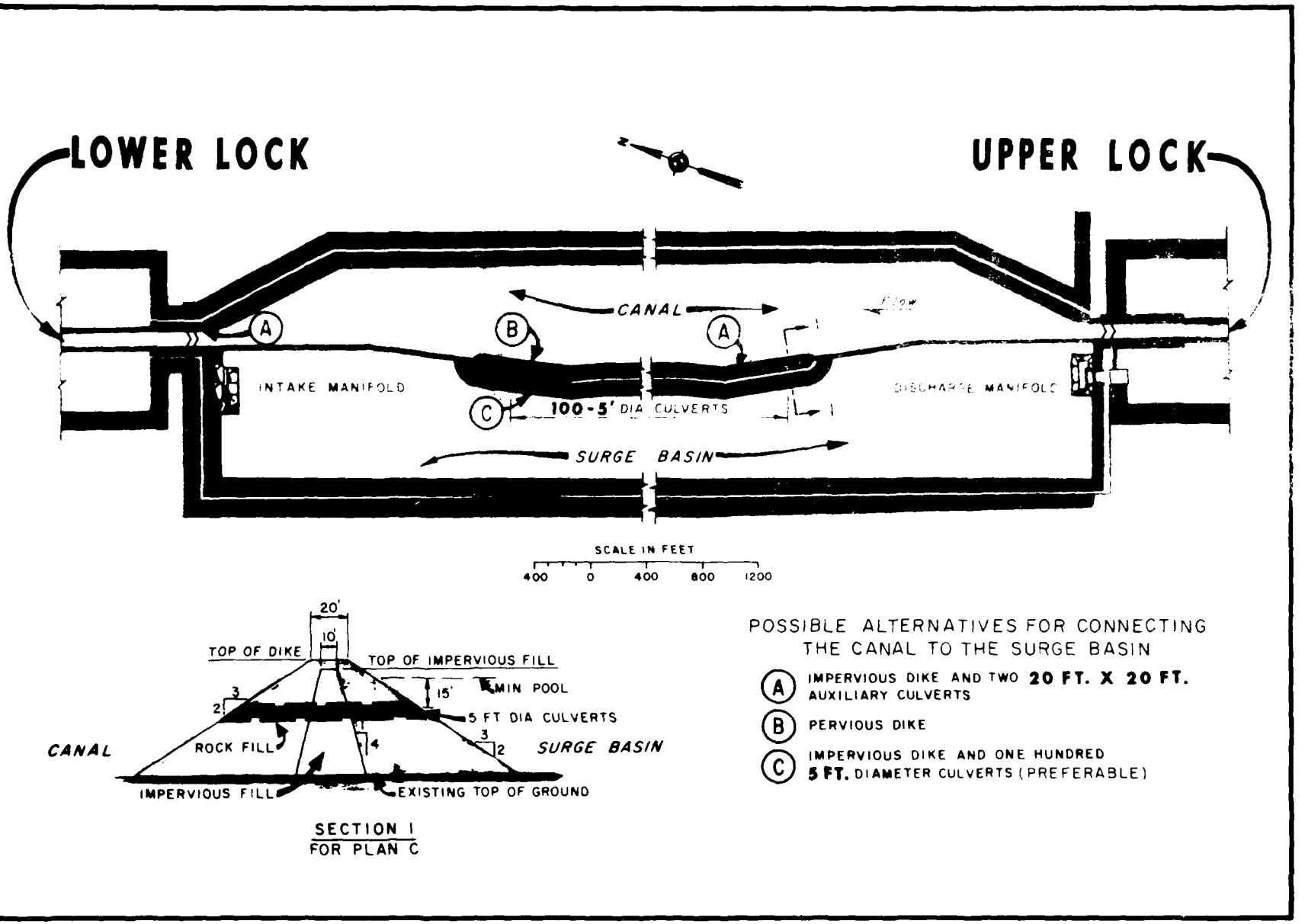
ATTACHMENT 3



FILLING SYSTEM

NOT DRAWN TO SCALE

ATTACHMENT 4



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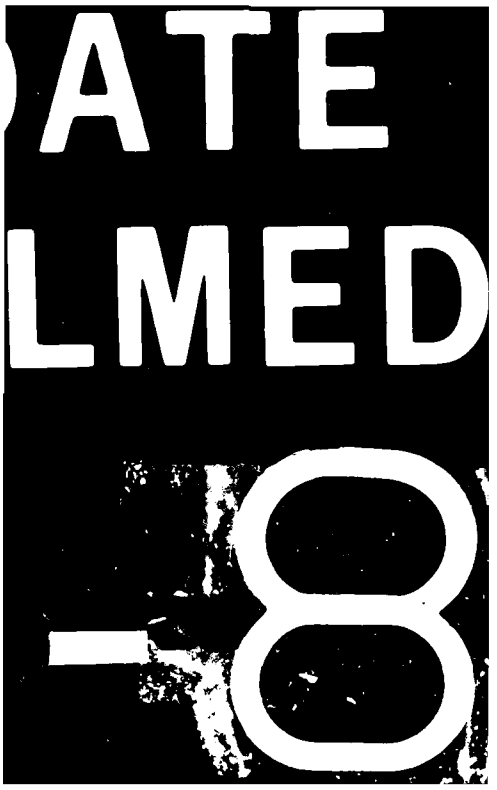
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